

# To Observe Polarisation Of Light Using Two Polaroids

## Aim

To observe polarisation of light using two Polaroid's.

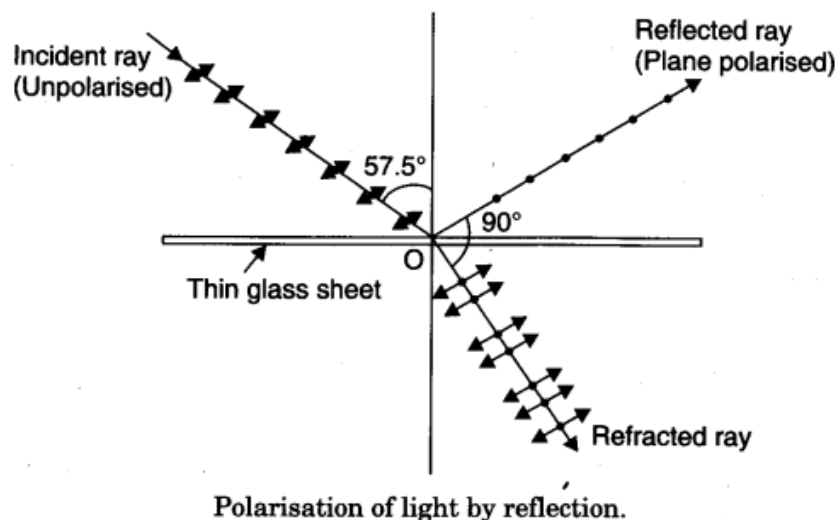
## Apparatus

Thin glass sheet, a source giving monochromatic light beam with parallel rays, a Polaroid.

## Theory

When an unpolarised light is made incident on the interface of two transparent media at polarising angle, the refracted and reflected rays depart from each other at an angle of  $90^\circ$ . The reflected ray is completely plane polarised. It can be tested by a polaroid.

## Diagram



## Procedure

Keep the thin glass sheet in a horizontal plane surface with a hole under the sheet.

Take a beam of monochromatic light having parallel rays and make it incident on the upper face of the glass sheet.

Adjust the angle of incidence to  $57.5^\circ$ .

Observe the reflected rays and the refracted rays. They must make an angle of  $90^\circ$  with each other. Testing of Polarisation

1. Take a polaroid (P) and keep it in between incident light and your eyes. Rotate it about an axis along incident ray. No change of intensity of light will be detected. It is so because the incident light is unpolarised.

2. Take the second Polaroid (A) and place it at a proper distance between polaroid (P) and eye and parallel to it. Light is visible through them.
3. Now rotate the Polaroid (A) ranging from  $0^\circ$  to  $360^\circ$ . Keeping the polaroid (P) fix and note the intensity of transmitted light.
4. When Polaroid (A) and Polaroid (P) at  $90^\circ$  than transmitted light through polaroid (A) will be zero.

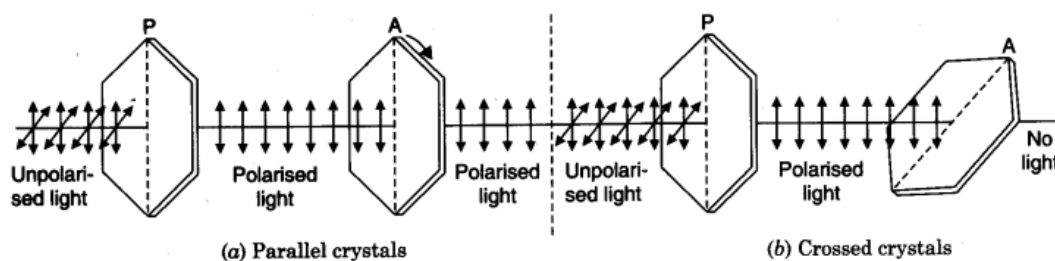
## Result

When the two polaroids are parallel to each other light transmitted through it. But when they are perpendicular, there is no transmitted light. The light obtained through Polaroid (P) is plane polarised. The light has transverse nature.

## Precautions

1. Two Polaroids and source of light should be in a straight line.
2. Rotate only second polarised from  $0^\circ$  to  $360^\circ$ . It is so, because the reflected light is completely plane polarised.

Figure shows the arrangement for testing the polarisation of light by tourmaline crystals which act as polaroids.



Testing of polarisation of light by tourmaline crystals.